Beyond the Fourth Amendment: Limiting Drone Surveillance Through the Constitutional Right to Informational Privacy

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I. LOOKING BEYOND THE FOURTH AMENDMENT

In a high-rise apartment unit, a man glances out the window at the city below. He notices a swift movement in the periphery of his vision. By the time he focuses on the movement, the object is gone. That night in the city, a similar scene is repeated countless times. On the outskirts of the city a woman arrives home after a long day of work. Pulling into her driveway, she cannot help but feel that someone is watching her. Gathered around the table of the home across the street, a family shares a meal under their skylight. In the home next door a woman sits by the window to watch television with her son. On the street outside of these homes, a game of street hockey rages. As the game dies down, the children return to their respective homes to prepare for tomorrow's busy school day. In all of these situations, unmanned aerial systems ("UASs"),[1] more commonly known as drones, have observed and recorded the activities described. This is not a scene from a cyberpunk novel, however. This is 2015: the year that the Federal Aviation Administration ("FAA") is slated to integrate drones into the domestic airspace of the United States.[2]

Widespread domestic drone use is only a few years away in the United States. Currently, the FAA grants drone operation permits for two main groups: drone researchers and developers; and public entities, including law enforcement agencies and the military.[3] Concerns over the safe integration of drones into the national airspace have slowed the FAA's approval of

[1] The FAA defines a UAS as an "unmanned aircraft (UA) and all of the associated support equipment, control station, data links, telemetry, communications and navigation equipment, etc., necessary to operate the unmanned aircraft." *Unmanned Aircraft (UAS): Questions and Answers*, FAA, http://www.faa.gov/about/initiatives/uas/uas_faq/ (last modified July 26, 2013, 12:29 PM). The FAA goes on to define a UA as "the flying portion of the system, flown by a pilot via a ground control system, or autonomously through use of an on-board computer, communication links and any additional equipment that is necessary for the UA to operate safely." *Id.*

[2] *FAA Makes Progress with UAS Integration*, FAA, http://www.faa.gov/news/updates/?newsId=68004 (last modified May 14, 2012, 3:09 PM).

[3] *Fact Sheet—Unmanned Aircraft Systems (UAS)*, FAA (Feb. 19, 2013), http://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=14153.

widespread drone use.[4] Nonetheless, the FAA is steadily increasing the number of permits that it grants each year.[5] Under pressure from Congress, the unmanned aeronautics industry, and public agencies, the FAA has eased the permit-granting process for public agencies seeking to employ drones.[6] By 2015, the FAA expects to have fully integrated drones into the nation's airspace.[7]

The domestic use of drones by private and public actors poses considerable privacy concerns for Americans.[8] Unfortunately the current statutory and regulatory framework—which focuses on ensuring safety rather than regulating surveillance tactics[9]—proves inadequate to protect against drone privacy intrusions. This situation does not seem likely to change in the near future given the political pressure in favor of domestic drone use.[10] Fourth Amendment jurisprudence also fails to safeguard individual privacy interests in the face of drone use.[11] The Supreme Court's current Fourth Amendment analysis provides some protections against drone surveillance directed at homes.[12] Yet, outside of the home, the Court's current precedent essentially gives free rein to law enforcement officials to utilize aerial observation without a warrant.[13] Recognizing the significant privacy invasions that widespread domestic drone

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[4] JAY STANLEY & CATHERINE CRUMP, ACLU, PROTECTING PRIVACY FROM AERIAL SURVEILLANCE: RECOMMENDATIONS FOR GOVERNMENT USE OF DRONE AIRCRAFT 1, 6 (2011), *available at* http://www.aclu.org/files/assets/protectingprivacyfromaerialsurveillance.pdf.

[5] *Fact Sheet—Unmanned Aircraft Systems (UAS)*, *supra* note 3.

[6] *FAA Makes Progress with UAS Integration*, *supra* note 2.

[7] *Id.*

[8] Although this Note focuses on the privacy implications of drone use in the United States, one should recognize that civil drone use is not strictly an American phenomenon. *See Civilian Companies Eye Big Potential for Domestic Drone Use*, PRI'S "THE WORLD" (Jan. 24, 2013, 10:30 AM), http://www.pri.org/stories/2013-01-24/civilian-companies-eye-big-potential-domestic-drone-use (Canada is moving ahead more quickly than the United States; "[y]ou can get a permit to fly a [drone] in a matter of weeks through the Transport Canada agency."); Kim Sengupta, *Unmanned Spy Planes to Police Britain*, INDEP. (Aug. 6, 2008), http://www.independent.co.uk/news/uk/home-news/unmanned-spy-planes-to-police-britain-886083.html (reporting that British law enforcement officials hope to utilize UASs for surveillance purposes).

[9] Travis Dunlap, Comment, *We've Got Our Eyes on You: When Surveillance by Unmanned Aircraft Systems Constitutes a Fourth Amendment Search*, 51 S. TEX. L. REV. 173, 202 (2009) (contending that "[t]he FAA's primary concern is safety," not the enactment of privacy standards).

[10] *See FAA Makes Progress with UAS Integration*, *supra* note 2.

[11] *See* Kyllo v. United States, 533 U.S. 27, 34–35 (2001); California v. Ciraolo, 476 U.S. 207, 213–15 (1986); Dow Chem. Co. v. United States, 476 U.S. 227, 235–40 (1986).

[12] *Kyllo*, 533 U.S. at 34–35.

[13] *See Ciraolo*, 476 U.S. at 213–15; *Dow Chem.*, 476 U.S. at 235–40.

use will occasion,[14] courts should analyze drone surveillance under the assumed constitutional right to informational privacy as first articulated by the Supreme Court in *Whalen v. Roe*.[15] Specifically, courts should apply the federal constitutional right to privacy through a balancing test that weighs individual privacy interests against government interests in drone surveillance.[16] If a court finds a violation of the constitutional right to privacy, the court could limit the storage, aggregation, transfer, and distribution of information observed with respect to the challenged drone surveillance.[17]

Other scholars have clamored for regulatory and legislative remedies to protect against invasive drone surveillance.[18] Likewise, numerous commentators have analyzed the Fourth Amendment implications of drone surveillance.[19] However, this Note offers a unique perspective: it represents the first effort to craft a safeguard against drone surveillance rooted in the constitutional right to informational privacy. Although designed to limit the collection and distribution of drone surveillance information, this Note's proposed balancing test and remedies could apply broadly to other public surveillance systems that gather and aggregate extensive amounts of information. The privacy protections relevant to city-wide camera[20] and license plate scanning systems, for example, could benefit from a balancing test rooted in the constitutional right to informational privacy.

This Note proceeds as follows. Part II examines the capabilities of drones and describes their current and potential applications within the domestic context. The capability of drones to surveil individuals in public for potentially

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[14] *See, e.g.*, Noah Shachtman, *Army Tracking Plan: Drones That Never Forget a Face*, WIRED (Sept. 28, 2011, 6:30 AM), http://www.wired.com/dangerroom/2011/09/ drones-never-forget-a-face/.

[15] 429 U.S. 589 (1977).

[16] *See infra* Part V.

[17] *See infra* Part V.

[18] *See, e.g.*, Benjamin Kapnik, *Unmanned but Accelerating: Navigating the Regulatory and Privacy Challenges of Introducing Unmanned Aircraft into the National Airspace System*, 77 J. AIR L. & COM. 439, 461–65 (2012); Troy Roberts, Comment, *On the Radar: Government Unmanned Aerial Vehicles and Their Effect on Public Privacy Interests from Fourth Amendment Jurisprudence and Legislative Policy Perspectives*, 49 JURIMETRICS J. 491, 516–18 (2009).

[19] *See, e.g.*, Joseph J. Vacek, *Big Brother Will Soon Be Watching—Or Will He? Constitutional, Regulatory, and Operational Issues Surrounding the Use of Unmanned Aerial Vehicles in Law Enforcement*, 85 N.D. L. REV. 673, 679–84 (2009); Dunlap, *supra* note 9, at 201–04; Paul McBride, Comment, *Beyond Orwell: The Application of Unmanned Aircraft Systems in Domestic Surveillance Operations*, 74 J. AIR L. & COM. 627, 661–62 (2009).

[20] *See* Rebecca J. Rosen, *London Riots, Big Brother Watches: CCTV Cameras Blanket the UK*, ATLANTIC (Aug. 9, 2011, 3:30 PM), http://www.theatlantic.com/technology/ archive/2011/08/london-riots-big-brother-watches-cctv-cameras-blanket-the-uk/243356/ ("In London and its surrounding boroughs alone, local authorities have a minimum of 8,000 cameras trained on the public.").

indefinite periods of time[21] provides the impetus for courts to revisit their jurisprudence on the constitutional right to informational privacy. Part III explains why the Fourth Amendment, as well as statutory and tort law, inadequately protects individuals from the unique intrusiveness of drones. Part IV analyzes the current application of the constitutional right to informational privacy and the right's disparate application among the circuits. Finally, Part V argues that courts should utilize the constitutional right to informational privacy when confronted with claims of privacy intrusion involving drone surveillance. The constitutional right to privacy would encompass an individual cause of action against governmental entities. Courts would assess invasion of privacy claims by weighing the individual's privacy interest against the government's interest. Part V concludes by applying the proposed constitutional privacy balancing test to long-term drone surveillance in public areas.

II. THE PRIVACY-INTRUDING POTENTIAL OF DRONES

Once a dedicated weapon of war,[22] unmanned aerial systems have transitioned to the home front in recent years.[23] Drones have obtained considerable public exposure through their central role in the U.S.-led "war on terror." Notorious on the battlefield for their reconnaissance and targeted strike capabilities, drones have become indispensable to the United States Armed Forces due to their cost efficiency, extended flight duration, and versatility.[24] These same qualities that attracted the military to drones have captured the attention of businesses and government agencies.[25] Businesses have voiced interest in employing drones for various uses, including crop management, parcel delivery, surveying and aerial mapping, and pipeline management for oil

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[21] *See* Rob Waugh, *The "Clean" Spy in the Sky: Boeing Unveils Hydrogen-Powered Surveillance Drone Which Can Stay Airborne for Days*, DAILY MAIL ONLINE (June 6, 2012, 7:35 AM), http://www.dailymail.co.uk/sciencetech/article-2155332/The-clean-spy-sky-Boeing-unveils-hydrogen-powered-surveillance-drone-stay-airborne-days.html.

[22] Dunlap, *supra* note 9, at 176 (explaining that "UASs were born out of military interest"). As early as 1915, aerial torpedoes and guided rockets comprised the first generation of UAS technology. *Id.* at 176–77.

[23] Larry Abramson, *Drones Drifting into Markets Outside War Zones*, NPR (Aug. 13, 2012, 3:00 PM), http://www.npr.org/2012/08/13/158715809/drones-drifting-into-markets-outside-war-zones.

[24] Michael W. Lewis, *Drones and the Boundaries of the Battlefield*, 47 TEX. INT'L L.J. 293, 296–97 (2012) (noting that "it is the relatively low cost of drones compared to that of modern combat aircraft that will drive the proliferation of drones over the next decade").

[25] *Drones Moving from War Zones to the Home Front*, NPR (Apr. 17, 2012, 1:00 PM), http://www.npr.org/2012/04/17/150817060/drones-move-from-war-zones-to-the-home-front ("[I]magine—for example, a small-town police force that doesn't have the budget for its own helicopter, or to even charter a helicopter. The ability to put a drone up above a hostage situation could provide some genuinely lifesaving imagery, and makes that within reach—unmanned aircraft make that within reach of pretty much every police department in the country.").

and gas companies.[26] Likewise, all variety of local, state, and federal government entities envision using drones in the near future.[27]

Under pressure from businesses and government agencies eager to start experimenting with drones, Congress passed the FAA Modernization and Reform Act of 2012.[28] The Act mandates the FAA to develop a comprehensive plan that will lead to the incorporation of drones into the national airspace system by September 30, 2015.[29] As the FAA works toward implementing its drone integration plan, entities can apply to operate drones on a temporary, case-by-case basis. To operate unmanned aircraft within the national airspace system, public non-military operators must obtain a Certificate of Waiver or Authorization (COA) from the FAA.[30] Entities that can apply for and receive a COA include federal, state, and local government agencies.[31] COAs generally remain valid for two years.[32] Private sector entities can only obtain an Experimental Aircraft Certification,[33] which, as compared to a COA, typically restricts entities from operating drones over "densely populated area[s] or in . . . congested airway[s]."[34]

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[26] *See* Roberts, *supra* note 18, at 492, 498 ("The roles of military UAV technology are shifting and adapting to domestic airspace . . . . Domestic, nonmilitary organizations are planning to use UAVs for a broad range of missions . . . .").

[27] *Id.*

[28] FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, § 334(c), 126 Stat. 11, 76–77.

[29] § 334(b), 126 Stat. at 76; Kapnik, *supra* note 18, at 444; *see FAA Makes Progress with UAS Integration*, *supra* note 2.

[30] Kapnik, *supra* note 18, at 444–45. The same regulations that apply to manned aircraft flying in the national airspace system also apply to unmanned aircraft. *Id.* at 444. Yet, because unmanned aircraft cannot meet a number of the standard regulations (e.g., UASs do not have the capability of seeing and avoiding obstacles), the FAA requires drone operators to obtain a COA. *Id.* at 444–45. The FAA reviews non-military COA applications to ensure the airworthiness of UASs. *Id.* at 445. "To qualify for a certificate, the applicant must show the aircraft's response to losing communication with its operator, protocol if communication cannot be recovered, and that the unmanned aircraft can be contained within a proposed flight area." *Id.* COA applicants must also provide the FAA with a proposed operating area for the drone, operations manuals and checklists for the aircraft, documentation verifying that the flight personnel have received training in the drone's operation, evidence of the proper pilot and medical certification among the flight personnel, and evidence of Federal Communications Commission (FCC) approval of the drone's communication frequency. *Id.* at 445–46.

[31] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-12-981, UNMANNED AIRCRAFT SYSTEMS: MEASURING PROGRESS AND ADDRESSING POTENTIAL PRIVACY CONCERNS WOULD FACILITATE INTEGRATION INTO THE NATIONAL AIRSPACE SYSTEM 6 (2012).

[32] *FAA Makes Progress with UAS Integration*, *supra* note 2.

[33] U.S. GOV'T ACCOUNTABILITY OFFICE, *supra* note 31, at 6–7.

[34] 14 C.F.R. § 91.319(c) (2013); Vacek, *supra* note 19, at 688 ("Both the COA process and the Experimental Certification process are burdensome for operators and industry. However, the COA seems to be the method of choice for the main reason that an experimental certificate is specific to one aircraft, whereas a COA is for use of certain designated airspace by any number of aircraft. Either way, when a potential operator wishes

Despite the current challenges of obtaining a COA or Experimental Aircraft Certification, and in spite of the flight limitations that these waivers impose,[35] public and private entities have eagerly employed drone technology. The growing number of COAs issued over the past several years reveals the keen interest in domestic drone use: the FAA issued 146 COAs in 2009; 298 in 2010; and 313 in 2011.[36] During the first half of 2012, the FAA issued 342 COAs to government entities and eight Experimental Aircraft Certifications to drone manufacturers.[37] The FAA will likely issue even more COAs in coming years, as in May 2012, the FAA announced that it had reached an agreement with the National Institute of Justice that will streamline the COA attainment process for government public safety agencies.[38] Indeed, a drone market study predicts worldwide drone expenditures to more than double between 2010 and 2020—from $4.9 billion annually to $11.5 billion.[39] This enhanced spending on unmanned aircraft technology may amount to manufacturers' producing more than 20,000 drones in the United States between 2010 and 2019.[40]

In conjunction with the recent proliferation of drones operating domestically, commentators have begun to recognize the serious potential for privacy invasions posed by widespread drone use.[41] To illuminate why drones

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to obtain FAA clearance to fly a UAV in the national air space, he or she must comply with either of those limitations or risk enforcement action by the FAA.").

[35] Kapnik, *supra* note 18, at 447 (COA holders can only use UASs within the line of sight of the operator, "under 400 feet in altitude, and at least five miles from an airport or other similar location.").

[36] *Fact Sheet—Unmanned Aircraft Systems (UAS)*, *supra* note 3.

[37] U.S. GOV'T ACCOUNTABILITY OFFICE, *supra* note 31, at 7.

[38] *FAA Makes Progress with UAS Integration*, *supra* note 2 ("Initially, law enforcement organizations will receive a COA for training and performance evaluation. When the organization has shown proficiency in flying its UAS, it will receive an operational COA. The agreement also expands the allowable UAS weight up to 25 pounds.").

[39] *Teal Group Predicts Worldwide UAV Market Will Total Over $80 Billion in Its Just Released 2010 UAV Market Profile and Forecast*, PR NEWSWIRE (Feb. 1, 2010), http://www.prnewswire.com/news-releases/teal-group-predicts-worldwide-uav-market-will-total-over-80-billion-in-its-just-released-2010-uav-market-profile-and-forecast-83233947.html. The UAS market is projected to continue "as one of the hottest areas of growth for defense and aerospace companies." *Id.*

[40] JOINT PLANNING & DEV. OFFICE, NEXT GENERATION AIR TRANSPORTATION SYSTEM: UNMANNED AIRCRAFT SYSTEMS RESEARCH, DEVELOPMENT AND DEMONSTRATION ROADMAP 1–2 (2012); *see also* James Pinkerton, *Use of Drones in Community Policing "Unchartered Territory,"* HOUS. CHRON. (Oct. 26, 2012, 8:37 AM), http://www.chron.com/news/houston-texas/houston/article/Use-of-drones-in-community-policing-unchartered-3981675.php ("[T]he Federal Aviation Administration estimates that 30,000 drones could be flying by 2020 . . . .").

[41] *See* Editorial, *Checks and Balances for Drones*, GAZETTE (July 22, 2012, 12:43 AM), http://thegazette.com/2012/07/22/checks-and-balances-for-drones/ ("If you think . . . traffic cameras crossed the 'Big Brother is watching us' line, well, that's nothing compared to the intrusion potential of drones."); A. Barton Hinkle, *Should We Let Law Enforcement Drone On and On?*, TIMESDISPATCH.COM (June 8, 2012), http://www.timesdispatch.com/news/hinkle-should-we-let-law-enforcement-drone-on-and-on/article_bad3f7da-e1a4-582a-951d-

pose such a grave danger to privacy in the United States, the following sections explore the physical capabilities, current uses, and potential uses of drones.

A. *Physical Capabilities of Drones*

Government agencies and businesses of all varieties envision using drones for a multitude of purposes. Drones can serve in such a broad range of functions precisely because of the diversity of drone sizes and designs.[42] Complementing the diversity of drone designs are the myriad sensors, cameras, and other surveillance equipment that operators can install on drones.

Drones vary in size from the miniature to the gargantuan. Measuring 6.5 inches and weighing in at nineteen grams, AeroVironment's Nano Hummingbird might be the most diminutive drone at present.[43] More typically, however, small drones have wingspans of ten feet or less and weigh between four and twenty pounds.[44] Operating at speeds of less than 100 knots and at altitudes below 500 feet, small drones often run on batteries and can stay airborne for as long as two hours.[45] Large drones have wingspans of up to 150 feet and can weigh over 30,000 pounds.[46] These systems can operate at altitudes of up to 65,000 feet, cruise at speeds of up to 320 knots, and remain airborne without refueling for anywhere from thirty-five hours to four days.[47]

Small drones enjoy stealth and maneuverability, making them ideal for urban surveillance operations.[48] Because many small drones operate on electricity, they produce very little noise.[49] Additionally, the relatively slow cruising speeds of small drones permit them to loiter over a surveillance target

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91dae2a34aba.html#facebook-comments (admonishing that "there also are reasons not to accept the drone-ification of the American skies with bovine complacency").

[42] JOINT PLANNING & DEV. OFFICE, *supra* note 40, at 1 ("About 50 U.S. companies, universities, and government organizations in the U.S. are developing over 150 different unmanned aircraft designs.").

[43] STANLEY & CRUMP, *supra* note 4, at 3 (The Nano Hummingbird "can fly up to 11 miles per hour and can hover, fly sideways, backwards and forwards, for about 8 minutes."); *see Nano Air Vehicle (NAV)*, AEROVIRONMENT, http://www.avinc.com/nano (last visited Jan. 23, 2013) ("Employing biological mimicry at an extremely small scale, this unconventional aircraft could someday provide new reconnaissance and surveillance capabilities in urban environments.").

[44] DEP'T OF DEF., UNMANNED SYSTEMS INTEGRATED ROADMAP FY2011–2036, at 21 (2011); STANLEY & CRUMP, *supra* note 4, at 2–3.

[45] DEP'T OF DEF., *supra* note 44, at 21; McBride, *supra* note 19, at 629.

[46] McBride, *supra* note 19, at 629; Waugh, *supra* note 21.

[47] McBride, *supra* note 19, at 629; Waugh, *supra* note 21 ("[D]esigned to carry out surveillance and reconnaissance missions while remaining at high altitude," the Boeing Phantom Eye is powered by liquid-hydrogen and can remain in the air for up to four days without refueling.). Boeing is also developing the Phantom Ray, a spy plane powered solely by hydrogen "that will stay aloft for more than 10 days." *Id.*

[48] *See* McBride, *supra* note 19, at 637–38 (reporting how "many of the small UAS platforms are designed to be portable, rapidly deployed, and easily operated").

[49] *Id.* at 637.

for extended periods of time.[50] Some drones do not ever need to loiter, as certain drone designs permit the aircraft to both hover and fly normally.[51] In order to extend flight time, other drones engage in "perch-and-stare" surveillance.[52]

Most pertinent to privacy concerns, drones can be equipped with a wide variety of surveillance equipment.[53] Civilian operators can easily install cameras and recorders with high-powered zoom lenses on drones. Certain cameras have been developed specifically for civilian UAS use. The gimbal camera, for example, automatically remains focused on a single object even as the drone continues on its flight path.[54] More worrisome to privacy advocates, drones can be equipped with infrared and ultraviolet imaging devices,[55] see-through imaging (radar technology),[56] and distributed video systems.[57] Drones engaged in perch-and-stare surveillance might also utilize acoustical eavesdropping devices, such as conventional microphones or laser optical microphones.[58] In terms of software, drones operating in the near future will likely utilize video processing systems, including face and body recognition technology.[59] Finally, civilian drones, like their military counterparts, can carry

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[50] *Id.*

[51] Vasilios Tasikas, *Unmanned Aerial Vehicles and the Doctrine of Hot Pursuit: A New Era of Coast Guard Maritime Law Enforcement Operations*, 29 TUL. MAR. L.J. 59, 67 (2004) (explaining that the Bell Eagle Eye can both hover and fly normally as well as take off and land vertically).

[52] Timothy T. Takahashi, *Drones and Privacy*, 14 COLUM. SCI. & TECH. L. REV. 72, 86 (2012). The concept behind "perch-and-stare" surveillance is to "avoid energy-intensive moving or hovering flight by securing itself to a vantage point and turning off its propulsion mechanism." *Id.* "'Perch-and-stare' capability in a small surveillance [UAS] offers great tactical advantage . . . . By powering down the propulsion system, the persistence of surveillance can be extended greatly." *Id.*

[53] *Id.* at 85–91. "The surveillance mission payload of a UAV may contain a wide variety of sensors and detectors." *Id.* at 86.

[54] Abramson, *supra* note 23. The gimbal camera was designed with police forces in mind, as police operators "might not have as much time to train [in UAS camera operating techniques] as a military user." *Id.*

[55] Takahashi, *supra* note 52, at 87–88.

[56] STANLEY & CRUMP, *supra* note 4, at 5.

[57] *Id.* at 6; Ellen Nakashima & Craig Whitlock, *With Air Force's Gorgon Drone "We Can See Everything,"* WASH. POST (Jan. 2, 2011, 12:09 AM), http://www.washingtonpost.com/wp-dyn/content/article/2011/01/01/AR2011010102690.html (describing the Air Force's Gorgon Stare system—a UAS mounted with nine video cameras that "can send up to 65 different images to different users").

[58] Takahashi, *supra* note 52, at 88 ("Acoustical systems function by day and by night while laser systems function on wavelengths not easily visible to humans. No physical trespass is necessary in order to record the sounds from inside a structure. The usable range of these devices may approach 1000 feet . . . .").

[59] Shachtman, *supra* note 14. Progeny Systems Corporation boasts that it can take an existing drone and turn it into a "Tagging, Tracking, and Locating" (TTL) machine. *Id.* By capturing "just 50 pixels between the target's eyes," Progeny states that its system can build a 3D model of the target's face. *Id.* "Once the target is 'enrolled' in Progeny's system, it

weaponry. Although lethal weapons are almost certainly out of the question, law enforcement drones might soon pack rubber bullets and tear gas.[60]

Taking full advantage of drone capabilities, domestic users have already put drones to work in a variety of capacities. Although domestic drones have numerous beneficial applications, they also carry the potential for abuse. Exacerbating this concern, government agencies and private operators intend to employ drones for so many purposes that drones will someday form a ubiquitous part of life. Even in the immediate future, however, targeted and inadvertent UAS surveillance poses a threat to privacy.

B. *Current and Potential Drone Applications*

Outside of the military context,[61] government agencies currently utilize drones in a wide variety of applications. The Customs and Border Protection agency has operated drones around the borders since 2005.[62] Customs and Border Protection drones uncover intelligence on illegal border crossings and major drug trafficking operations.[63] Likewise, the Coast Guard hopes to use drones "to reconnoiter large maritime areas."[64] The FBI and the Drug Enforcement Agency have utilized drones within the United States; the Customs and Border Protection agency has even made its drones available to local police departments for domestic law enforcement operations.[65] On a local scale, numerous municipal police departments have obtained permission from the FAA to use drones.[66] These drones have been used to help with security at sporting events, surveil private property, and assist with crime prevention.[67] In a

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might only take 15 or 20 pixels to identify him again. A glance or two at a [drone's] camera might conceivably be enough." *Id.*

[60] STANLEY & CRUMP, *supra* note 4, at 11; Conor Friedersdorf, *Congress Should Ban Armed Drones Before Cops in Texas Deploy One*, ATLANTIC (May 24, 2012, 9:45 AM), http://www.theatlantic.com/national/archive/2012/05/congress-should-ban-armed-drones-before-cops-in-texas-deploy-one/257616/.

[61] Drones have attained considerable notoriety for their role in executing targeted missile strikes in locations including Afghanistan, Pakistan, and Yemen. Lewis, *supra* note 24, at 294–96. In addition to direct combat roles, drones equipped with cameras and night vision have been utilized to gather intelligence on the battlefield. Nakashima & Whitlock, *supra* note 57.

[62] Dunlap, *supra* note 9, at 180.

[63] STANLEY & CRUMP, *supra* note 4, at 6–7.

[64] Tasikas, *supra* note 51, at 59–60 ("The Coast Guard envisions deploying UAVs with the ability to provide real-time information by transmitting video, radar imagery, and positional data to a remote control center. The Coast Guard foresees that these control centers will be located either on Coast Guard cutters or at shore-based installations. The control centers will in turn relay the position and vector of a suspect vessel to a Coast Guard cutter, which will use its onboard navigation equipment to intercept the suspect vessel and take law enforcement action.").

[65] STANLEY & CRUMP, *supra* note 4, at 6–7.

[66] *Id.* at 6–8.

[67] *Id.* at 7–8.

more academic context, NASA and NOAA have used drones for scientific research and environmental monitoring.[68]

All of these current applications have attracted considerable interest in future career opportunities related to drone technology. In anticipation of the increased demand for drone operators, educational institutions, such as the University of North Dakota, now offer undergraduate programs in unmanned aircraft systems operations.[69]

As these examples illustrate, ubiquitous drone operation within the United States is not far in the future. The widespread use of maneuverable and stealthy drones equipped with powerful sensory tools leads to the unsettling conclusion that domestic drones could gather an inordinate amount of information about people, both inadvertently and intentionally.[70] The information that government drone operators could obtain through long-term drone observation might range from the trivial—what gym a person frequents—to the intimate—a person's healthcare choices—but when considered as a whole, extended observation can reveal "the full picture of a person's life."[71] Also, regardless of whether UAS operators actually record any information about people's lives, the prospect of constant government monitoring and recording "chills associational and expressive freedoms."[72] The imminent mass arrival of drones in the United States will almost certainly imperil privacy. But problematically, the Fourth Amendment, and other current privacy safeguards, fall short of providing sufficient privacy protection against UAS surveillance.

III. WHY CURRENT REMEDIES FAIL TO ADEQUATELY PROTECT AGAINST DRONE PRIVACY INTRUSIONS

As 2015 and widespread domestic drone use draw closer, Americans currently have at their disposal only a handful of legal protections to guard against invasive government drone surveillance. Confronted with drone surveillance perpetrated by private businesses or other nongovernmental actors,

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[68] *Fact Sheet—Unmanned Aircraft Systems (UAS)*, *supra* note 3.

[69] *Civilian Companies Eye Big Potential for Domestic Drone Use*, *supra* note 8.

[70] *Cf.* Adam Schwartz, *Chicago's Video Surveillance Cameras: A Pervasive and Poorly Regulated Threat to Our Privacy*, 11 NW. J. TECH. & INTELL. PROP. 47, ¶ 23 (2013) (describing how Chicago's integrated video surveillance system "empowers City government, if it chooses, to track how any or all people spend all of their time in all public places").

[71] Orin S. Kerr, *The Mosaic Theory of the Fourth Amendment*, 111 MICH. L. REV. 311, 325 (2012).

[72] Schwartz, *supra* note 70, ¶ 26 ("The net result is that . . . monitoring—by making available at a relatively low cost such a substantial quantum of intimate information about any person whom the Government, in its unfettered discretion, chooses to track—may alter the relationship between citizen and government in a way that is inimical to democratic society." (citation omitted) (internal quotation marks omitted)).

individuals might rely on tort law claims[73] including nuisance,[74] trespass,[75] intrusion upon seclusion,[76] and public exposure of private facts.[77] However, torts typically will not constitute an effective recourse to drone privacy invasions committed by government entities, due to sovereign-immunity principles. As such, the potential safeguards against government drone surveillance include statutory and regulatory protections and the Fourth Amendment. Currently, both of these options fail to provide satisfactory privacy

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[73] RESTATEMENT (SECOND) OF TORTS § 652B (1977); Geoffrey Christopher Rapp, *Unmanned Aerial Exposure: Civil Liability Concerns Arising from Domestic Law Enforcement Employment of Unmanned Aerial Systems*, 85 N.D. L. REV. 623, 631, 643 (2009).

[74] It would be difficult to state a valid cause of action for nuisance. The Supreme Court held in *United States v. Causby* that flights over property only constitute a taking if they are "so low and so frequent as to be a direct and immediate interference with the enjoyment and use of the land." United States v. Causby, 328 U.S. 256, 266 (1946). Drones tend to fly at high altitudes, so they generally would not cause a direct interference with land use. Moreover, in cases where courts have found a nuisance caused by aircraft, the property in question typically sits in close proximity to an airport. *Id.* at 258, 264–66; Greater Westchester Homeowners Ass'n v. City of L.A., 603 P.2d 1329, 1330–31 (Cal. 1979). Due to the relatively quiet operation of most drones, it is very unlikely that isolated drone use could generate the amount of noise disruption necessary to state a nuisance claim.

[75] To state a successful trespass cause of action, the drone in question would have to fly so low as to actually interfere with the landowner's use of his or her land. Pueblo of Sandia v. Smith, 497 F.2d 1043, 1045 (10th Cir. 1974); Rapp, *supra* note 73, at 631. Given that drones can obtain pictures and videos from hundreds or thousands of feet in the sky, a trespass cause of action would not lie in most instances of drone surveillance.

[76] The tort of intrusion upon seclusion may represent one of the more promising tort claims against invasive drone surveillance; however, even the intrusion tort has its limitations. An actionable claim for intrusion upon seclusion requires that the observation in question be "highly offensive to a reasonable person." Jane Yakowitz Bambauer, *The New Intrusion*, 88 NOTRE DAME L. REV. 205, 244 (2012). The "highly offensive" requirement severely limits the types of drone surveillance that would fall within the scope of the intrusion tort. Notably, "[i]nformation that is voluntarily shared with an individual or the public can be observed without offense by that individual." *Id.* at 245.

[77] As Professors Neil Richards and Daniel Solove have explained, "the chorus of opinion is that the tort law of privacy has been ineffective, particularly in remedying the burgeoning collection, use, and dissemination of personal information in the Information Age." Neil M. Richards & Daniel J. Solove, *Prosser's Privacy Law: A Mixed Legacy*, 98 CALIF. L. REV. 1887, 1889 (2010). The limitation of privacy torts is that they "have proven quite difficult for plaintiffs to win, and the torts have not kept pace with contemporary privacy problems." *Id.* at 1918. Invasions under privacy torts must be highly offensive to a reasonable person, yet today's technologies tend to collect "bits and pieces" of "relatively innocuous information that fails to be offensive enough in each instance to rise to the level of highly offensive." *Id.* at 1919 (internal quotation marks omitted). Additionally, privacy disclosure torts typically do not protect against information disclosed to the public (e.g., information obtained through surveillance of individuals in public areas). *Id.* at 1920; *see* Heidi Reamer Anderson, *The Mythical Right to Obscurity: A Pragmatic Defense of No Privacy in Public*, 7 ISJLP 543, 553 (2012).

protections, especially in the context of information gathered by drones in public places.

A. *The Current Dearth of Statutory and Regulatory Protections*

At present, the regulations most relevant to drone use come from the FAA. Yet, the FAA's regulations do not address privacy issues.[78] Instead, the FAA's regulations focus on operational safety and the logistics of integrating drones into the national airspace system.[79] Some politicians have proposed legislation that would regulate drone surveillance techniques and mandate transparency in drone utilization.[80] However, only a handful of state and local legislative proposals have crystallized, leaving the nation with a patchwork of inconsistent privacy protections.[81] In short, statutory and regulatory protections prove insufficient to protect against drone privacy invasions in the near future because only a scattered few states have passed drone privacy legislation and relevant federal statutes and regulations simply do not exist yet.[82]

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[78] *See* U.S. GOV'T ACCOUNTABILITY OFFICE, *supra* note 31, at 32–36; Vacek, *supra* note 19, at 677–79, 688–92.

[79] *See* Vacek, *supra* note 19, at 677–79, 688–92.

[80] *E.g.*, Allie Bohm, *Drone Legislation: What's Being Proposed in the States?*, ACLU (Mar. 6, 2013, 3:15 PM), https://www.aclu.org/blog/technology-and-liberty-national-security/drone-legislation-whats-being-proposed-states; Pinkerton, *supra* note 40 (Ted Poe (R-Humble) proposed the Preserving Privacy Act, which would "require law enforcement agencies to obtain a search warrant before conducting extensive surveillance after showing there was probable cause a crime was committed.").

[81] *See, e.g.*, Allie Bohm, *Status of Domestic Drone Legislation in the States*, ACLU (Feb. 15, 2013, 12:21 PM), https://www.aclu.org/blog/technology-and-liberty/status-domestic-drone-legislation-states (Legislation aimed at curbing domestic drone surveillance has been proposed in forty-two states but enacted in only eight states.); Martin Kaste, *As Police Drones Take Off, Washington State Pushes Back*, NPR (Feb. 22, 2013, 5:46 PM), http://www.npr.org/2013/02/22/172696814/as-police-drones-take-off-washington-state-pushes-back; Pinkerton, *supra* note 40.

[82] Although statutes and regulations may serve as an effective shield against drone privacy invasions in the long run, there is no guarantee that additional states will restrict drone surveillance or that federal lawmakers will even pass privacy legislation dealing with drone surveillance. It is equally questionable whether state and federal agencies will promulgate regulations curtailing drone applications, especially considering the widespread enthusiasm for drone use among numerous government agencies. Moreover, due to Congress's "short attention span," any national legislation passed has the dangerous potential of becoming "outdated by the rapid advance of technology." Daniel T. Pesciotta, Note, *I'm Not Dead Yet:* Katz, Jones, *and the Fourth Amendment in the 21st Century*, 63 CASE W. RES. L. REV. 187, 247 (2012). Indeed, outdated legislation

> may create even greater confusion than . . . outdated common law. While the judicial community is constantly evaluating and reevaluating the common law, congressionally enacted statutes may remain untouched for long periods of time. In the context of rapidly advancing technology, such statutes could actually become "straitjackets" that hamper the growth and development of the technology they seek to regulate.

B. *The Fourth Amendment's Narrow Protections*

In its protections against "unreasonable searches and seizures,"[83] the Fourth Amendment currently represents the most effective shield against intrusive drone surveillance. The Fourth Amendment provides some protection against drone surveillance directed at homes, especially when the surveillance involves sense-enhancing technology.[84] However, upon closer examination, the Fourth Amendment's protections prove unsatisfactory.[85] Specifically, current Fourth Amendment jurisprudence provides only minimal protection against drone surveillance conducted in public places (essentially anywhere outside of a home).[86]

Since *Katz v. United States*, the Supreme Court has applied a two-pronged test to identify Fourth Amendment searches.[87] The test incorporates a subjective and an objective component, such that the government commits a search if it infringes upon an area where an individual exhibits "an actual (subjective) expectation of privacy" and the expectation is "one that society is prepared to recognize as 'reasonable.'"[88] Application of the Court's reasonable expectation of privacy test ensures that most drone surveillance occurring outside of the home or curtilage will not constitute a search—because a person typically cannot manifest a "reasonable" expectation of privacy when she is in public.[89] Equally disconcerting, the reasonable expectation of privacy test, in conjunction with the Court's ruling in *Kyllo v. United States*, implies that surveillance technologies, such as thermal-imaging devices, may one day be utilized without a warrant when the technology becomes generally available to the public or

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Id.

[83] U.S. CONST. amend. IV.

[84] *See* Kyllo v. United States, 533 U.S. 27, 34 (2001).

[85] Richard C. Turkington, *Legacy of the Warren and Brandeis Article: The Emerging Unencumbered Constitutional Right to Informational Privacy*, 10 N. ILL. U. L. REV. 479, 494–95 (1990) ("The restriction of constitutional informational privacy rights to government searches leaves a large area of governmental invasions of privacy that are beyond the reach of the Constitution. Under current construction of the Constitution much of the information that a person discloses to someone may be acquired by the government without a search of the person within the meaning of the fourth amendment."); Vacek, *supra* note 19, at 692 (conceding that the Supreme Court's "aerial surveillance trilogy seems to approve the use of UAVs in domestic surveillance").

[86] *See, e.g.*, California v. Ciraolo, 476 U.S. 207, 213–14 (1986).

[87] Katz v. United States, 389 U.S. 347, 361 (1967) (Harlan, J., concurring).

[88] *Id.*

[89] *See* Matthew Radler, Note, *Privacy Is the Problem:* United States v. Maynard *and a Case for a New Regulatory Model for Police Surveillance*, 80 GEO. WASH. L. REV. 1209, 1231–32 (2012) (A basic ambiguity exists in the *Katz* test: "whether an expectation of privacy is reasonable because the subject matter is typically not scrutinized in practice, which is an empirical question about probability, or because it is not legally or customarily permitted, which is a normative question."); Pesciotta, *supra* note 82, at 222 (arguing in support of the reasonable expectation of privacy test and contending that "it is unreasonable to expect information revealed to the public to remain private").

when widespread government use of the technology renders individual expectations of privacy toward the technology unreasonable.[90]

In the context of drone surveillance that occurs over an extended period of time, the Court's recent decision in *United States v. Jones* suggests that long-term drone surveillance may not constitute a search unless the surveillance involves a physical intrusion into a constitutionally protected area—such as a home or car.[91] And, even if non-physically invasive, long-term surveillance does constitute a search, current Fourth Amendment jurisprudence provides little guidance as to when surveillance crosses the line and becomes a search.[92]

The discussion in the following sub-sections further elucidates the shortcomings of the Fourth Amendment as an effective shield against drone privacy invasions.

1. *The "Aerial Surveillance Trilogy"*

Over the course of four years, the Supreme Court decided three cases dealing with government aerial surveillance.[93] In each of these cases the Court found that the government did not commit a search under the Fourth Amendment.[94]

In *California v. Ciraolo*, police officers obtained an anonymous tip that marijuana was being grown in the defendant's backyard.[95] The officers could not observe the defendant's backyard because the defendant had placed two fences around the yard, a six-foot outer fence and a ten-foot inner fence; as such, the officers flew over the defendant's yard in a plane at an altitude of 1,000 feet.[96] Without the aid of any magnification devices, the officers in the

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[90] *See* Kyllo v. United States, 533 U.S. 27, 34 (2001); Russell L. Weaver, *The Fourth Amendment, Privacy and Advancing Technology*, 80 MISS. L.J. 1131, 1183 (2011) ("Although the [reasonable expectation of privacy] test was crafted to deal with the problem of advancing technology, the Court has generally not chosen to apply *Katz* expansively when it has been confronted by new forms of technology . . . . The difficulty is that, as technology gets better, individual expectations of privacy may become less and less reasonable."); Dunlap, *supra* note 9, at 199–200 (contending that the technologies currently utilized in drones for aerial surveillance "have the potential to escape the firm rule of *Kyllo*" if they enter into general public use).

[91] *See* United States v. Jones, 132 S. Ct. 945, 957–58 (2012) (Alito, J., concurring) (criticizing the majority for applying "18th-century tort law" to a case involving the use of "a 21st-century surveillance technique, the use of a Global Positioning System (GPS) device to monitor a vehicle's movements for an extended period of time").

[92] Radler, *supra* note 89, at 1236 (complaining that the current Fourth Amendment test for whether tracking constitutes an impermissible search "leaves it entirely unclear how prolonged the tracking must be to trigger the Fourth Amendment's protections").

[93] Joseph Vacek coined the phrase "aerial surveillance trilogy." Vacek, *supra* note 19, at 681 & n.42.

[94] Florida v. Riley, 488 U.S. 445, 449–52 (1989); California v. Ciraolo, 476 U.S. 207, 213–15 (1986); Dow Chem. Co. v. United States, 476 U.S. 227, 239 (1986).

[95] *Ciraolo*, 476 U.S. at 209.

[96] *Id.*

plane identified marijuana plants in the defendant's backyard.[97] The Supreme Court held that the officers, in flying over and observing the defendant's backyard with their naked eyes, did not commit a Fourth Amendment search.[98] Even accepting that the backyard constituted part of the curtilage of the defendant's home,[99] the Court held that the defendant did not manifest a reasonable expectation of privacy in his backyard because the backyard was "clearly visible" from "a public vantage point."[100] So, under the Court's ruling, the view from a plane flying at 1,000 feet is considered to be a public vantage point.[101]

Extending the *Ciraolo* Court's reasoning to drones, the Fourth Amendment's protections of the home and curtilage will most likely not protect against drone surveillance directed at the backyard of a home.[102] *Ciraolo* also implies that individuals cannot manifest a reasonable expectation that they will be free from aerial surveillance in public areas away from the home; if the Fourth Amendment does not protect a home's publicly visible curtilage, it almost certainly does not protect publicly visible areas outside of the curtilage.[103] Importantly, however, the Court in *Ciraolo* only adjudicated the constitutionality of naked-eye aerial observations.

Whereas *Ciraolo* involved naked-eye aerial surveillance of a home's uncovered backyard, *Dow Chemical Co. v. United States* dealt with the government's aerial photography of an enclosed industrial complex.[104] The Dow Chemical Company ("Dow") operated a manufacturing facility that

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[97] *Id.*

[98] *Id.* at 213–14 (explaining that the "respondent's expectation that his garden was protected from [publicly visible] observation is unreasonable and is not an expectation that society is prepared to honor").

[99] "It is now well established that individuals have a reasonable expectation of privacy for the purposes of the Fourth Amendment not only in their homes, but also in the curtilage surrounding their dwelling." Carrie Leonetti, *Open Fields in the Inner City: Application of the Curtilage Doctrine to Urban and Suburban Areas*, 15 GEO. MASON U. C.R. L.J. 297, 301 (2005). The curtilage encompasses the area immediately surrounding the home. *Id.* at 300. Areas not immediately adjacent to the home typically do not obtain Fourth Amendment protections; the Supreme Court refers to these unprotected areas as "open fields." Oliver v. United States, 466 U.S. 170, 178–79 (1984).

[100] *Ciraolo*, 476 U.S. at 213 ("That the area is within the curtilage does not itself bar all police observation. The Fourth Amendment protection of the home has never been extended to require law enforcement officers to shield their eyes when passing by a home on public thoroughfares. Nor does the mere fact that an individual has taken measures to restrict some views of his activities preclude an officer's observations from a public vantage point where he has a right to be and which renders the activities clearly visible.").

[101] *See id.* at 215.

[102] *See id.* ("The Fourth Amendment simply does not require the police traveling in the public airways at this altitude to obtain a warrant in order to observe what is visible to the naked eye.").

[103] *See id.* at 213–14 ("Any member of the public flying in this airspace who glanced down could have seen everything that [the officers in *Ciraolo*] observed.").

[104] Dow Chem. Co. v. United States, 476 U.S. 227, 229 (1986).

consisted of covered buildings, manufacturing equipment, and piping conduits.[105] Dow protected the facility from ground-level view but only partially concealed the facility from aerial views.[106] The Environmental Protection Agency (EPA) requested to inspect Dow's facility, but Dow denied the request.[107] So, the EPA hired an aerial photographer to photograph the facility from various altitudes within navigable airspace.[108] Applying the *Katz* reasonable expectation of privacy test, the Court held that the EPA's actions did not constitute a search in violation of the Fourth Amendment because Dow did not manifest a reasonable expectation that its commercial facility would remain private to members of the public flying over the facility.[109] The Court analogized Dow's outdoor facility more to an "open field"[110] (which does not receive Fourth Amendment protections) than to the curtilage of a home (which does receive Fourth Amendment protections).[111]

Ciraolo left open the question of whether aerial surveillance conducted with visual enhancing technology constitutes a search. Yet, as the Court established in *Dow Chemical*, aerial surveillance conducted with an advanced camera system does not constitute a search under the Fourth Amendment.[112] Applied to the context of drone surveillance, the holding in *Dow Chemical* implies that drones will not commit a search if they utilize cameras[113] to conduct

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[105] *Id.*

[106] *Id.*

[107] *Id.*

[108] *Id.* ("EPA employed a commercial aerial photographer, using a standard floor-mounted, precision aerial mapping camera, to take photographs of the facility from altitudes of 12,000, 3,000, and 1,200 feet. At all times the aircraft was lawfully within navigable airspace.").

[109] *Id.* at 239.

[110] The Court in *Dow Chemical* explained that "open fields" do not obtain Fourth Amendment protections because unlike the curtilage of a home they "'do not provide the setting for those intimate activities that the [Fourth] Amendment is intended to shelter from governmental interference or surveillance.'" *Dow Chem. Co.*, 476 U.S. at 235 (quoting Oliver v. United States, 466 U.S. 170, 179 (1984)).

[111] *Id.* at 239 ("[T]he open areas of an industrial plant complex with numerous plant structures spread over an area of 2,000 acres are not analogous to the 'curtilage' of a dwelling for purposes of aerial surveillance; such an industrial complex is more comparable to an open field . . . .") (footnote omitted).

[112] *Id.*; Christopher Slobogin, *Technologically-Assisted Physical Surveillance: The American Bar Association's Tentative Draft Standards*, 10 HARV. J.L. & TECH. 383, 394 (1997) ("The camera used in *Dow Chemical* had a magnification capability of 240x . . . . [This] fact[] did not give the Court pause, because the camera could be purchased on the commercial market.").

[113] The Court in *Dow Chemical* focused on the fact that the EPA had employed a conventional camera and not "some unique sensory device." *Dow Chem. Co.*, 476 U.S. at 238. In dicta presaging the *Kyllo* decision, the Court stated that "[a]n electronic device to penetrate walls or windows so as to hear and record confidential discussions of chemical formulae or other trade secrets would raise very different and far more serious questions . . . ." *Id.* at 239.

surveillance in publicly visible areas—regardless of whether those areas encompass the fenced curtilage of a home or partially enclosed commercial property.[114]

The most recent of the Court's aerial surveillance trilogy, *Florida v. Riley* involved the government's use of a helicopter to peer into a partially covered greenhouse.[115] The defendant in *Riley* owned a greenhouse that was completely enclosed except for two missing roof panels.[116] Based on a tip that the defendant was growing marijuana in the greenhouse, a sheriff's deputy used a helicopter to circle the defendant's property at 400 feet; through the uncovered portion of the greenhouse roof, the deputy observed marijuana plants with his naked eyes.[117] Noting that the government's helicopter did not violate any aviation regulations by flying at 400 feet, the *Riley* Court held that the defendant could not manifest a reasonable expectation of privacy in his greenhouse given that the greenhouse was partially exposed to aerial observation.[118]

Taken together, the holdings in *Dow Chemical*, *Ciraolo*, and *Riley* suggest that individuals may only manifest a reasonable expectation of privacy that an area will not be subject to drone surveillance if that area is not visible from the air.[119] To avoid Fourth Amendment protections, drone operators must simply ensure that drones remain in authorized airspace while they conduct surveillance.[120]

2. *Advanced Technology*

In 2004, the Supreme Court addressed the Fourth Amendment implications of advanced surveillance technologies directed at homes. The Court in *Kyllo v. United States* held that the government's warrantless use of a thermal-imaging device on a home constitutes a search under the Fourth Amendment.[121] The ruling does not only encompass thermal-imaging devices, however. Under *Kyllo*, using a "sense-enhancing" device to obtain information about the interior of a home without a warrant violates the Fourth Amendment if the device is not

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[114] *See id.*

[115] Florida v. Riley, 488 U.S. 445, 447–48 (1989).

[116] *Id.* at 448 ("At the time relevant to [the] case, two of the panels, amounting to approximately 10% of the roof area, were missing.").

[117] *Id.*

[118] *Id.* at 450–51. The Court suggested that it might have decided *Riley* differently if the government's helicopter had violated a law or regulation by flying at the altitude of 400 feet. *Id.* at 451.

[119] *See id.* at 450; California v. Ciraolo, 476 U.S. 207, 213–15 (1986); *Dow Chem. Co.*, 476 U.S. at 235, 238–39.

[120] *See Riley*, 488 U.S. at 451–52; Slobogin, *supra* note 112, at 397–98.

[121] Kyllo v. United States, 533 U.S. 27, 34 (2001).

in general public use and obtains information that would only otherwise be revealed by a physical intrusion into the home.[122]

Scholars have expressed doubt that the Court's ruling in *Kyllo* will encompass the most common drone surveillance tools—cameras and video recorders—due to the fact that these tools are in general public use.[123] In other words, drone surveillance probably only constitutes a search under *Kyllo* if the drone uses a thermal-imaging camera, or other scanner (1) that is not generally sold to the public, (2) to reveal information about the interior of a home that could only otherwise be obtained by a physical intrusion.[124] Irrespective of these protections afforded to the home, the *Kyllo* decision does not prevent drones from using sense-enhancing devices, not in general public use, when the target is located in a publicly visible area.[125]

Other scholars have asserted that drone surveillance generally falls within *Kyllo*'s prohibition because drones themselves are "sense-enhancing" devices that are not in general public use.[126] Yet, with the increased domestic use of drones, it is questionable that courts would consider this logic compelling for long.[127]

3. *Long-Term Surveillance*

Although the *Katz* reasonable expectation of privacy test remains valid, a five-Justice majority of the Court returned to a physical, trespass-based analysis to determine the existence of a search in a recent GPS tracking case.[128] In

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[122] *Id.*

[123] Vacek, *supra* note 19, at 679–84; Dunlap, *supra* note 9, at 201–04. Although predating the *Kyllo* test, *Dow Chemical* provides some insight as to what factors the Court takes into account when determining whether a device is "in general public use." The cost of a device does not seem to constitute a factor: the camera used in *Dow Chemical* cost $22,000. Slobogin, *supra* note 112, at 394.

[124] *See Kyllo*, 533 U.S. at 34 ("We think that obtaining by sense-enhancing technology any information regarding the interior of the home that could not otherwise have been obtained without physical 'intrusion into a constitutionally protected area,' constitutes a search—at least where (as here) the technology in question is not in general public use." (citation omitted)).

[125] *See id.*; Slobogin, *supra* note 112, at 393 ("When a vantage point *is* lawful . . . even surveillance using enhancement devices is often found to be acceptable—several courts have held, for instance, that so long as the vantage point is lawful, using binoculars to look into a private residence is not a search.").

[126] McBride, *supra* note 19, at 651–61.

[127] In addition to enhanced government drone use leading to a reduced expectation of privacy, the burgeoning commercial operation of drones will also erode individuals' expectations of privacy. *Cf.* Mary G. Leary, *The Missed Opportunity of* United States v. Jones*: Commercial Erosion of Fourth Amendment Protection in a Post-Google Earth World*, 15 U. PA. J. CONST. L. 331, 344–51 (2012) (opining that the public availability of images through Google Earth and Google Street View diminishes the ability of individuals to manifest both a subjective and an objective expectation of privacy).

[128] United States v. Jones, 132 S. Ct. 945, 949, 952 (2012).

United States v. Jones, government agents attached a GPS tracking device to the defendant's vehicle while the vehicle was in a public parking lot.[129] The agents replaced the batteries in the device while the vehicle was parked in a different public parking lot, and the government subsequently obtained information from the device for twenty-eight days.[130] Although the Court unanimously agreed that the government committed a search in *Jones*, the Justices split sharply as to the underlying test. A five-Justice majority of the Court held that the government's installation of a GPS tracking device on the defendant's vehicle constituted a search in violation of the Fourth Amendment because the government's actions amounted to a trespass under common law.[131] In a four-vote concurrence, Justice Alito found a search through the application of the *Katz* reasonable expectation of privacy test.[132] Justice Alito suggested that society does not expect law enforcement to engage in the type of long-term surveillance entailed by a GPS monitor for most offenses.[133] Lastly, Justice Sotomayor contended that the government committed a search in two ways: through a physical trespass; and through the compilation and aggregation of data collected over an extended period of time.[134] Under Justice Sotomayor's mosaic approach, although people might expect the government to observe some of their public movements, people do not expect the government to record and compile all of their movements.[135]

The majority opinion in *Jones* would provide almost no protection against drone surveillance, as drones can engage in surveillance without making physical contact with the subject.[136] Either of the concurring opinions could safeguard against long-term drone surveillance.[137] However, under either Justice Alito's or Justice Sotomayor's approach, the level of protection against

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[129] *Id.* at 948. Although the agents had a warrant to install the GPS device, the agents failed to place the device during the time period specified by the warrant. *Id.*

[130] *Id.*

[131] *Id.* at 949 ("The Government physically occupied private property for the purpose of obtaining information. We have no doubt that such a physical intrusion would have been considered a 'search' within the meaning of the Fourth Amendment when it was adopted.").

[132] *Id.* at 959–60, 964 (Alito, J., concurring).

[133] *Id.* at 964 ("[R]elatively short-term monitoring of a person's movements on public streets accords with expectations of privacy that our society has recognized as reasonable. But the use of longer term GPS monitoring in investigations of most offenses impinges on expectations of privacy . . . . For such offenses, society's expectation has been that law enforcement agents and others would not—and . . . simply could not—secretly monitor and catalogue every single movement of an individual's car for a very long period." (internal citations omitted)).

[134] *Jones*, 132 S. Ct. at 954–57 (Sotomayor, J., concurring).

[135] *Id.* at 956 ("I would take [the] attributes of GPS monitoring into account when considering the existence of a reasonable societal expectation of privacy in the sum of one's public movements. I would ask whether people reasonably expect that their movements will be recorded and aggregated . . . .").

[136] *See id.* at 949 (majority opinion).

[137] *See id.* at 955–56 (Sotomayor, J., concurring); *id.* at 964 (Alito, J., concurring).

long-term surveillance is far from clear. Neither of the concurring opinions clearly demarcates when long-term surveillance would constitute a search. Additionally, the privacy protections available under both approaches remain tied to the reasonable expectation of privacy test, such that an individual's expectation that he will not be subject to extended surveillance will become unreasonable as the government utilizes domestic drones more frequently.[138]

The Supreme Court's Fourth Amendment jurisprudence related to aerial surveillance, advanced technology, and extended monitoring all carry the limitation that an expectation of privacy be "reasonable."[139] As applied by the Court, the reasonableness requirement narrows the area where an individual can expect to remain free from drone surveillance to the home, particularly, those areas of the home that are not visible to the public.[140]

IV. THE ASSUMED CONSTITUTIONAL RIGHT TO INFORMATIONAL PRIVACY

To date, the Supreme Court has not definitively recognized the existence of a constitutional right to informational privacy. Yet, in two cases decided in 1977 the Court assumed the existence of a constitutional right to privacy and applied a balancing test to determine whether the assumed right had been violated.[141] As recently as 2011 the Court adjudicated a claim involving an asserted violation of the assumed constitutional right to privacy.[142]

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[138] *See Jones*, 132 S. Ct. at 955–56 (Sotomayor, J., concurring); *id.* at 964 (Alito, J., concurring); Leary, *supra* note 127, at 360–63 (criticizing the approaches from *Jones* suggested by Justice Sotomayor and Justice Alito as insufficient to protect against privacy invasions when technology is changing rapidly or when "information is obtained unbeknownst to the individual").

[139] *E.g.*, Florida v. Riley, 488 U.S. 445, 450–51 (1989); *see* Weaver, *supra* note 90, at 1159 ("Looked at in its entirety, including the bulk of United States Supreme Court cases construing *Katz*, the Court has construed the [reasonable expectation of privacy] test rather narrowly in the sense that there are few cases when the Court has found that a [reasonable expectation of privacy] exists when it would not have found a search under its pre-*Katz* precedent.").

[140] *See* Kyllo v. United States, 533 U.S. 27, 34 (2001); California v. Ciraolo, 476 U.S. 207, 213–15 (1986); Dow Chem. Co. v. United States, 476 U.S. 227, 235, 238–39 (1986).

[141] Nixon v. Adm'r of Gen. Servs., 433 U.S. 425, 457–59, 465 (1977); Whalen v. Roe, 429 U.S. 589, 598–604 (1977).

[142] NASA v. Nelson, 131 S. Ct. 746, 751, 756–57, 762–64 (2011) ("In two cases decided more than 30 years ago, this Court referred broadly to a constitutional privacy 'interest in avoiding disclosure of personal matters.' . . . We assume, without deciding, that the Constitution protects a privacy right of the sort mentioned in *Whalen* and *Nixon*.").

A. *Contours of the Constitutional Right to Privacy*

In *Whalen v. Roe*, the Supreme Court first articulated that the Constitution protects privacy outside of the Fourth Amendment context.[143] In *Nixon v. Administrator of General Services*, the Supreme Court reaffirmed this assumption in the context of informational privacy.[144] The Court assumed that privacy consists of two branches: informational privacy; and privacy through autonomy.[145] The right to informational privacy is the right to avoid disclosure of certain personal matters.[146] The right to privacy through autonomy is the right to make certain important life decisions independent of interference.[147] In both *Whalen* and *Nixon*, however, the Court found that the disputed government actions—recording the issuance of prescription drugs and sorting through presidential documents and recordings, respectively—did not amount to violations of this constitutional right.[148] Because the Court did not find a violation of the right to privacy in either instance, the Court found it unnecessary to declare the existence of the constitutional right to privacy or to clearly delineate its boundaries.[149]

In 2011, the Supreme Court once again assumed the existence of the constitutional right to privacy.[150] In *NASA v. Nelson*, the Court focused its analysis on the dangers represented by the government's collection and possible dissemination of personal information.[151] Ultimately, the Court found that

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[143] *Whalen*, 429 U.S. at 598–605 ("The right to collect and use . . . data for public purposes is typically accompanied by a concomitant statutory or regulatory duty to avoid unwarranted disclosures. . . . [T]hat duty arguably has its roots in the Constitution . . . .").

[144] *Nixon*, 433 U.S. at 457–59, 465.

[145] *Whalen*, 429 U.S. at 599–600.

[146] *Id.* at 599.

[147] *Id.* at 599–600; Turkington, *supra* note 85, at 498.

[148] *Nixon*, 433 U.S. at 465; *Whalen*, 429 U.S. at 603–04; *see* Turkington, *supra* note 85, at 498 (opining that the failure of the Court to find violations of the constitutional right to privacy in *Whalen* and *Nixon* "might properly be interpreted as suggesting that it would be appropriate for federal and state courts to find violations of the constitutional right to privacy in circumstances where the government invasion of privacy was significant and unjustified").

[149] *Nixon*, 433 U.S. at 457–59, 465; *Whalen*, 429 U.S. at 605–06 ("New York's statutory scheme, and its implementing administrative procedures, evidence a proper concern with, and protection of, the individual's interest in privacy. We therefore need not, and do not, decide any question which might be presented by the unwarranted disclosure of accumulated private data—whether intentional or unintentional—or by a system that did not contain comparable security provisions. We simply hold that this record does not establish an invasion of any right or liberty protected by the Fourteenth Amendment.").

[150] NASA v. Nelson, 131 S. Ct. 746, 751, 756 (2011) (explaining that the Court would "assume for present purposes that the Government's challenged inquiries implicate a privacy interest of constitutional significance").

[151] *Id.*

requiring individuals to provide information on drug use and treatment did not violate a constitutional right to privacy.[152]

The constitutional right to privacy, as construed in *NASA*, does not require a government action to be necessary or the least restrictive means of furthering the governmental interest.[153] Rather, the Court applied a balancing test to determine the constitutionality of NASA's action.[154] In comparing the governmental interests at stake to the privacy violation at issue, the Court considered the degree of use, duration, and value of NASA's practice.[155] The Court also suggested that a constitutional protection of privacy may not be necessary in situations where statutory or regulatory measures allay the privacy concerns.[156]

State courts and lower federal courts have addressed claims alleging a violation of the constitutional right to privacy in three main ways: by applying a balancing test (the intermediate scrutiny approach); by only permitting claims when the interests at stake are fundamental to the concept of liberty; and through non-recognition.[157]

1. *The Intermediate Scrutiny Approach*

Under the intermediate scrutiny approach, courts attempt to balance the government's interests against the individual's privacy interest. The Second, Third, Fifth, and Ninth Circuits, as well as the Supreme Court of Connecticut, have all adhered to the intermediate scrutiny approach in applying the constitutional right to privacy to claims involving governmental collection or distribution of certain types of personal information.[158]

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[152] *Id.* at 751, 756–57, 762–64 (holding that "the Government's inquiries do not violate a constitutional right to informational privacy"); Blythe Golay, Comment, NASA v. Nelson: *The High Court Flying High Above the Right to Informational Privacy*, 45 LOY. L.A. L. REV. 477, 484–85 (2012).

[153] *Nelson*, 131 S. Ct. at 760.

[154] *See id.*

[155] *Id.* at 759–61.

[156] *Id.* at 761.

[157] *See, e.g.*, Ferm v. United States (*In re* Crawford), 194 F.3d 954, 959 (9th Cir. 1999); Am. Fed'n of Gov't Emps. v. HUD, 118 F.3d 786, 791 (D.C. Cir. 1997); J.P. v. DeSanti, 653 F.2d 1080, 1090 (6th Cir. 1981).

[158] *E.g.*, *In re Crawford*, 194 F.3d at 959 (balancing the competing interests to determine if the collection and public disclosure of Social Security numbers under a federal statute violates the constitutional right to privacy); Woodland v. City of Hous., 940 F.2d 134, 139 (5th Cir. 1991) (instructing the district court on remand to conduct a balancing test to determine the constitutionality of a city's pre-employment polygraph tests); Fraternal Order of Police v. City of Phila., 812 F.2d 105, 110–11 (3d Cir. 1987) (applying a "flexible balancing test" to a police applicant selection questionnaire that inquires about applicants' medical history, finances, and organizational memberships); Barry v. City of N.Y., 712 F.2d 1554, 1559 (2d Cir. 1983) (observing that "some form of intermediate scrutiny or balancing approach is appropriate as a standard of review" and applying a balancing test to a city law mandating the collection and public inspection of financial information from certain city

Courts have typically treated the balancing of individual privacy interests against governmental interests as a question of law to be determined by the court.[159] When courts undertake this balancing test, they consider a multitude of factors, including the contents of the disputed information, the harm that could be caused by disclosure of the information, and the safeguards established to prevent unauthorized disclosure of the information.[160] Ultimately, however, the factors relevant to the balancing test vary from case to case based on the privacy interest purportedly violated.[161]

2. *The "Fundamental or Implicit in the Concept of Ordered Liberty" Approach*

The Sixth Circuit has taken a slightly different approach to the constitutional right to privacy. The Sixth Circuit finds unconstitutional intrusions to the informational privacy right only when the rights at stake are "'fundamental' or 'implicit in the concept of ordered liberty.'"[162] Through a citation to *Roe v. Wade*, the Sixth Circuit has implied that rights are "fundamental or implicit in the concept of ordered liberty" only if they relate to marriage, procreation, contraception, family relationships, and child rearing and education.[163] A number of commentators have criticized the Sixth Circuit's approach as misinterpreting Supreme Court precedent and inappropriately constraining the application of the constitutional right to privacy.[164]

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employees); State v. Russo, 790 A.2d 1132, 1147–50 (Conn. 2002) (recognizing that "as a general matter, a person reasonably may expect that his or her prescription records or information contained therein will not be disseminated publicly").

[159] *Woodland*, 940 F.2d at 138.

[160] *In re Crawford*, 194 F.3d at 959; *Fraternal Order of Police*, 812 F.2d at 110.

[161] *In re Crawford*, 194 F.3d at 959 ("[T]he relevant considerations will necessarily vary from case to case.").

[162] *DeSanti*, 653 F.2d at 1088–90 (asserting that "the fact that the Constitution protects several specific aspects of individual privacy does not mean that it protects all aspects of individual privacy"); *see, e.g.*, Bloch v. Ribar, 156 F.3d 673 (6th Cir. 1998).

[163] *DeSanti*, 653 F.2d at 1090; *see* Roe v. Wade, 410 U.S. 113, 152–53 (1973).

[164] In *Paul v. Davis*, a ruling predating *Whalen v. Roe*, the Supreme Court held that police officers do not violate an individual's constitutional right to privacy when they inaccurately inform merchants that an individual has been convicted of shoplifting. Paul v. Davis, 424 U.S. 693, 713 (1976). The Court in *Paul* held that the privacy rights protected by the Constitution only encompass those that are "'fundamental' or 'implicit in the concept of ordered liberty.'" *Id.* The *DeSanti* court stated that the Supreme Court's holding in *Whalen* did not overrule the Court's ruling in *Paul*. *DeSanti*, 653 F.2d at 1088–89. The *DeSanti* court thus relied on *Paul* to determine that the constitutional right to privacy only applies when a right is "'fundamental' or 'implicit in the concept of ordered liberty.'" *See id.* at 1090 (internal citations omitted). As commentators have noted, however, the Sixth Circuit's reliance on *Paul v. Davis* is "misplaced." Francis S. Chlapowski, Note, *The Constitutional Protection of Informational Privacy*, 71 B.U. L. REV. 133, 149 (1991); *see* Turkington, *supra* note 85, at 499–500 ("The court in *DeSanti* found that the dissemination in the two cases [*Paul* and *DeSanti*], of social histories and of an arrest, were indistinguishable. The sounder

3. *Non-recognition of the Constitutional Right to Privacy*

Given that the Supreme Court has never actually stated that the constitutional right to privacy exists, but rather has assumed that it exists for the purpose of disposing of cases, some courts have all but repudiated the right. The D.C. Circuit, for example, has stated that it has "grave doubts as to the existence of a constitutional right to privacy in the nondisclosure of personal information."[165] Yet, even after asserting its doubts as to the existence of a constitutional right to privacy, the D.C. Circuit has assumed for the purpose of adjudicating constitutional privacy claims that the right exists.[166] In applying the assumed right, the D.C. Circuit utilized a balancing test.[167]

In sum, the majority of circuits have recognized the existence of a constitutional right to privacy.[168] Courts recognizing the right have typically utilized a balancing test to determine whether a government action constitutes a violation of the constitutional right to privacy.[169]

V. LIMITING DRONE SURVEILLANCE THROUGH A CONSTITUTIONAL RIGHT TO PRIVACY

In its current inchoate form, the constitutional right to informational privacy could be molded by courts to address the privacy dilemma posed by drones. A broad swath of federal circuit courts and state supreme courts have recognized the existence of a federal constitutional right to privacy;[170] however, the right varies considerably from jurisdiction to jurisdiction. Whereas a plaintiff in the Ninth Circuit encounters a balancing[171] test, a plaintiff in the Sixth Circuit can only raise a constitutional privacy claim if the claim is "'fundamental' or 'implicit in the concept of ordered liberty.'"[172] The difference in legal standards

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view is that *Paul v. Davis* does not at all speak to the informational privacy right that has been recognized in *Whalen* and *Nixon*. The informational privacy claims in *Whalen* and *Nixon* were entirely different from the constitutional claim in *Paul*.").

[165] Am. Fed'n of Gov't Emps. v. HUD, 118 F.3d 786, 791 (D.C. Cir. 1997).

[166] *Id.* at 793 ("[T]here is no such constitutional right because in this case that conclusion is unnecessary. Even assuming the right exists, the government has not violated it on the facts of this case.").

[167] *Id.* ("Whatever the precise contours of the supposed right, both agencies have presented sufficiently weighty interests in obtaining the information sought by the questionnaires to justify the intrusions into their employees' privacy.").

[168] Barry v. City of N.Y., 712 F.2d 1554, 1559 (2d Cir. 1983); *see* Chlapowski, *supra* note 164, at 149.

[169] *Barry*, 712 F.2d at 1559; *see* Chlapowski, *supra* note 164, at 149.

[170] *See, e.g.*, Ferm v. United States (*In re* Crawford), 194 F.3d 954, 959 (9th Cir. 1999); Woodland v. City of Hous., 940 F.2d 134, 138 (5th Cir. 1991); Fraternal Order of Police v. City of Phila., 812 F.2d 105, 110 (3d Cir. 1987); *Barry*, 712 F.2d at 1559; State v. Russo, 790 A.2d 1132, 1147–50 (Conn. 2002).

[171] *See, e.g.*, *In re Crawford*, 194 F.3d at 959.

[172] *See, e.g.*, J.P. v. DeSanti, 653 F.2d 1080, 1090 (6th Cir. 1981).

between circuits and states has resulted in judicial confusion and varying degrees of privacy protection across the United States.[173] Yet, because the Supreme Court has not squarely defined the constitutional right to privacy, lower courts have considerable freedom going forward in their adjudication of claims involving an alleged violation of the right.

The imminent operation of myriad drones within the United States poses an opportunity for courts to both resolve the judicial confusion surrounding the constitutional right to privacy and to address some of the privacy concerns implicated by domestic drone use. The stealth, maneuverability, and long-term surveillance capabilities of drones render drone technology uniquely intrusive to privacy interests. Specifically, drones have the capability of compiling reams of photographic and video information both intentionally and inadvertently.[174] Government agencies could store, aggregate, analyze, and distribute this virtual treasure trove of information for years after a drone initially captured the information.[175] Although courts typically rely on the Fourth Amendment to protect against the government's abusive utilization of new technologies, the Fourth Amendment, as currently interpreted, provides only limited protection against drone surveillance conducted in publicly visible areas.[176]

A. *Adjudicating Drone Surveillance Claims Under the Constitutional Right to Privacy Through a Balancing Test*

To remedy these privacy concerns, courts should adjudicate cases involving drone surveillance under the constitutional right to informational privacy. As already recognized by most courts applying the right, the constitutional right to privacy creates a right of action against the government.[177] This right of action

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[173] *See* Mary D. Fan, *Constitutionalizing Informational Privacy by Assumption*, 14 U. PA. J. CONST. L. 953, 976 (2012).

[174] *See supra* notes 70–72 and accompanying text.

[175] Takahashi, *supra* note 52, at 91–92 ("Advances in digital storage technology enable permanent storage of extraordinarily detailed data. Law enforcement need no longer prospectively observe behavior to take action; they may retrospectively review archived surveillance data."); Carla Scherr, Note, *You Better Watch Out, You Better Not Frown, New Video Surveillance Techniques Are Already in Town (and Other Public Spaces)*, 3 ISJLP 499, 502 (2008) ("Increases in computing speed and storage capacities, along with decreases in hardware size, have been critical to the development of surveillance technology. Without these technological advances . . . the memory needed to store the images digitally would require warehouses full of memory units.").

[176] The Fourth Amendment offers some protection against physical invasions of privacy and against the use of sense-enhancing devices, not in general public use, to invade the privacy of the home or curtilage. *See* United States v. Jones, 132 S. Ct. 945, 949 (2012); Kyllo v. United States, 533 U.S. 27, 34 (2001). By contrast, the Fourth Amendment offers very few protections against the surveillance of publicly visible areas. *See supra* notes 83–90 and accompanying text.

[177] *See, e.g.*, Woodland v. City of Hous., 940 F.2d 134, 135 (5th Cir. 1991); Barry v. City of N. Y., 712 F.2d 1554, 1558–59 (2d Cir. 1983); Turkington, *supra* note 85, at 495–96

stands independent of the Fourth Amendment, augmenting the Fourth Amendment's protections rather than replacing them.[178]

When courts confront the claim that drone surveillance has invaded an individual's constitutional right to privacy, courts should apply the following test. First, courts should require a claimant to establish a threshold requirement: that a government action has implicated a privacy interest. Once this threshold criterion is met, the court should engage in a balancing test that weighs the individual's privacy interests against the government's interests in conducting the challenged drone surveillance. Courts should consider five factors when applying the balancing test: (a) the duration of the surveillance; (b) the invasiveness of the technologies used; (c) the thoroughness of the surveillance; (d) the individualized nature of the surveillance; (e) and the presence of a warrant or probable cause. If the individual's privacy interests outweigh the government's interests, then the court would, as a remedy, prohibit the government from storing, aggregating, transferring, or distributing any information gathered in the challenged surveillance. The court's remedy would apply both to any information that the government had already gathered and to information that the government might observe through the challenged drone surveillance in the future.[179] The subsequent discussion elucidates the elements of this balancing test.

1. *Meeting the Threshold Requirement: Establishing that the Government Has Implicated a Privacy Interest*

Courts should apply a broad definition of what constitutes a privacy interest when determining whether a constitutional privacy claim has met the threshold requirement for the proposed balancing test. Specifically, a claimant should establish that the government has implicated a privacy interest simply by the claimant asserting that his or her body or activity has been photographed, recorded, or in some way scanned by a drone. Although this broad interpretation of a privacy interest—an interest in limiting one's exposure to drone surveillance—diverges from the medical and financial disclosure claims typically brought under the constitutional right to privacy, an expanded interpretation of privacy finds support in the theoretical underpinnings that initially led the Court to assume the existence of the constitutional right to

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(describing the Ninth Circuit's holding in *York v. Story*, 324 F.2d 450 (9th Cir. 1963), where the court held that police officers' "distributions of the [naked] pictures did not amount to a fourth amendment search but constituted an 'intrusion upon the security of her privacy'").

[178] *See* Turkington, *supra* note 85, at 481, 496 ("The Constitution provides citizens with rights against significant invasions of privacy by the government even if the invasions did not occur through a search." (footnote omitted)).

[179] Although a court's remedy under a constitutional right to informational privacy would prohibit the government from storing, aggregating, transferring, or distributing any information gathered in the challenged drone surveillance, the remedy would not prohibit the government from observing drone feeds in real-time. *See infra* Part V.A.3.

informational privacy.[180] The Supreme Court countenanced a broad articulation of privacy in *Whalen v. Roe*.[181] Courts adjudicating constitutional right to privacy claims involving drone surveillance should look to the articulation of privacy found in *Whalen*. Under that articulation, privacy encompasses both an interest in "avoiding disclosure of personal matters" and an interest in "independence in making certain kinds of important decisions."[182] This broad conception of privacy aligns with the view held by commentators dating back to Samuel Warren and Louis Brandeis[183] that privacy involves more than an actual concealment of information; privacy encompasses a "right to be let alone."[184] The compilation through drone surveillance of photographs and video recordings of individuals' public activities violates both the right to be let alone and the accompanying understanding that people enjoy a degree of anonymity

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[180] *See* Whalen v. Roe, 429 U.S. 589, 599–600, 605 (1977); *see also* Turkington, *supra* note 85, at 498 ("It is especially significant that the authority cited by the Court [in *Whalen*] for the informational privacy branch included Brandeis' dissenting opinion in *Olmstead* and his reference to a concept that united the general theory of the right to privacy in the [Warren and Brandeis] article—the right to be let alone." (footnote omitted)). In his *Olmstead* dissent, Justice Brandeis elucidated a broad conception of constitutional privacy: "The protection guaranteed by the Amendments is much broader in scope. . . . [The makers of our Constitution] conferred, as against the government, the right to be let alone—the most comprehensive of rights and the right most valued by civilized men." Olmstead v. United States, 277 U.S. 438, 478 (1928) (Brandeis, J., dissenting).

[181] *Whalen*, 429 U.S. at 599–600.

[182] *Id.*

[183] In their seminal article on privacy, Samuel Warren and Louis Brandeis advised that "[r]ecent inventions and business methods call attention to the next step which must be taken for the protection of the person, and for securing to the individual . . . the right to be let alone." Samuel D. Warren & Louis D. Brandeis, *The Right to Privacy*, 4 HARV. L. REV. 193, 195 (1890) (internal quotation marks omitted). Warren and Brandeis presciently observed that "[i]nstantaneous photographs and newspaper enterprise have invaded the sacred precincts of private and domestic life; and numerous mechanical devices threaten to make good the prediction that what is whispered in the closet shall be proclaimed from the house-tops." *Id.* (internal quotation marks omitted).

[184] *See* Nadia B. Soree, *Show and Tell, Seek and Find: A Balanced Approach to Defining a Fourth Amendment Search and the Lessons of Rape Reform*, 43 SETON HALL L. REV. 127, 215–16 (2013) (explaining that the interest in privacy/autonomy "is as much about the 'right to be let alone' as it is about the right to choose not to be let alone, and to define the scope of our involvement and interactions with others"); Aimee Jodoi Lum, Comment, *Don't Smile, Your Image Has Just Been Recorded on a Camera-Phone: The Need for Privacy in the Public Sphere*, 27 U. HAW. L. REV. 377, 382 (2005) (noting that "the law of privacy" is connected by the common strand that it seeks to protect a plaintiff's right "to be let alone"). Professor Soree contends that "privacy should be based on an 'expectation of forebearance on the part of others—that is, in an expectation that others will restrain their curiosity with respect to those aspects of life that are essential to defining and maintaining individual identity.'" Soree, *supra* at 216 (quoting William C. Heffernan, *Fourth Amendment Privacy Interests*, 92 J. CRIM. L. & CRIMINOLOGY 1, 6 (2001)).

in public spaces.[185] Once a court has determined that a claimant has stated the threshold requirement—that the government photographed, recorded, or scanned the claimant using a drone—the court should apply a balancing test to determine if the government violated the claimant's privacy interest.

2. *Balancing Privacy Interests Against Drone Surveillance*

Many courts already have an institutional knowledge of how to apply a balancing test when hearing claims brought under the constitutional right to privacy, as courts in the Second, Third, Fifth, and Ninth Circuits currently utilize a balancing test under their intermediate scrutiny approach.[186] However, the balancing test that courts should apply when adjudicating constitutional privacy claims related to drone surveillance differs slightly from the standard balancing test. The proposed balancing test takes into account five factors when weighing an individual's privacy interests against the government's interests in drone surveillance. These factors include (a) the duration of the surveillance, (b) the invasiveness of the technologies used, (c) the thoroughness of the surveillance, (d) the individualized nature of the surveillance, and (e) the presence of a warrant or probable cause.

Notably, however, the balancing test does not factor in the reasonableness of an expectation of privacy.[187] Because the balancing test does not weigh the reasonableness of an individual's privacy interest, the publicly visible locus of a privacy infringement does not bar a person from making her privacy claim in

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[185] *See* Scherr, *supra* note 175, at 501 ("The current privacy-in-public standard was developed in the context of unsophisticated visual observation techniques and image-recording equipment with little capability to enhance the abilities of the naked eye. When the current law was developed, a person in a public space could expect to be seen and watched by others, and just as quickly forgotten.").

[186] *See supra* Part IV.A.1.

[187] The Fourth Amendment does not protect against privacy intrusions in public areas largely because the Supreme Court has held that individuals cannot manifest a reasonable expectation of privacy in public areas. *See supra* Part III.B. The jurisprudence interpreting California's state constitutional right to privacy also serves as a telling example of why the federal constitutional right to privacy should not utilize reasonableness as a factor when balancing individual privacy interests against the government's use of drone surveillance. The Supreme Court of California has interpreted an amendment to the California Constitution as creating a legal and enforceable right of privacy against both governmental and private parties. Hill v. NCAA, 865 P.2d 633, 644 (Cal. 1994). Despite the broad language found in campaign pamphlets urging the passage of California's constitutional privacy provision, California's privacy protections have failed to live up to supporters' expectations. Language from the proposed amendment suggests that the amendment's authors envisioned a much broader right that would hinge only on the existence of a legally protected privacy interest and an invasion of that interest. *Id.* at 688 (Mosk, J., dissenting). As California's constitutional privacy right is currently applied, however, potential claimants must establish that their expectation of privacy is "reasonable." *Id.* at 655 (majority opinion). This limitation severely qualifies California's privacy protections and hinges the success or failure of a claim on the California courts' conceptions of reasonableness.

court.[188] Although this more lenient standard would permit more cases to enter the judicial system, the development of case law would likely curtail the initial inundation of cases. The case law would establish the contours of the right—highlighting those situations where claimants stand a legitimate chance of proving that their privacy interests outweigh the government's interest in using drone surveillance.

a. *The Duration Factor*

Applying the duration factor, a court should be less likely to permit the recording and storage of information obtained through drone surveillance if the surveillance is protracted.[189] Courts should remain flexible in their durational analysis and avoid bright-line rules that would mandate the presence of a minimum surveillance time period for the finding of a violation. A flexible durational analysis accounts for the fact that drones can obtain a considerable amount of photographic, video, and sensory information in a relatively short period of time.

b. *The Invasiveness Factor*

The application of the invasiveness factor will help courts to distinguish between more traditional observation tactics and the use of highly intrusive scanner technologies. The government's use of relatively intrusive technologies would support a court's finding a privacy violation. So, for example, the government would be less likely to violate a privacy interest if it conducted surveillance using a drone-mounted camera with limited magnification capabilities as compared to a camera with high-magnification lenses. Similarly, drones utilizing high-resolution recorders should be considered more invasive than drones utilizing solely photographic equipment. Courts should consider drones utilizing infrared, ultraviolet, and see-through imaging devices to be even more invasive than those equipped with recording devices.[190]

Courts should also look beyond the drone-mounted device used to capture information; courts should evaluate the invasiveness of the data analysis and storage systems utilized by the government with respect to a challenged

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[188] *See* Yvonne F. Lindgren, *Personal Autonomy: Towards a New Taxonomy for Privacy Law*, 31 WOMEN'S RTS. L. REP. 447, 457 (2010) ("Thus, the right of privacy against government intrusion . . . is related to spatial privacy in that the degree to which a defendant may assert a reasonable expectation of privacy is directly related to the public or private categorization of the physical space invaded by governmental intrusion or surveillance.").

[189] *Cf.* Slobogin, *supra* note 112, at 397 (In the Fourth Amendment context, "[c]ourts have leveled criticism at prolonged observation and at observation that is insufficiently limited in objective.").

[190] *See* STANLEY & CRUMP, *supra* note 4, at 5; Takahashi, *supra* note 52, at 87–88.

surveillance activity.[191] A drone's use of facial or biometric recognition programs, for example, would impel a court to view the surveillance as more intrusive than if the drone operated without those programs.[192] Likewise, drones that are directly linked to advanced data compilation and analysis systems would be more intrusive than drones that operate using limited on-board memory.[193]

c. *The Thoroughness Factor*

The more thoroughly that the government surveils a person or area, the more likely a court should be to limit the government's surveillance.[194] For example, assume that the police surveil an individual for a period of several days simply because the drone operator considers the individual to look suspicious. Over the course of the surveillance, the drone observes the individual traveling to and from work, stopping by a beauty salon, going to the gym, and visiting friends. A court looking at surveillance that captures any one piece of this information may weigh the thoroughness factor in favor of the government. However, in the present example, where a drone has observed all of these pieces of information, a court should weigh the thoroughness factor in favor of the individual's privacy interests.[195] The thoroughness factor is distinct from the duration factor in that a drone could follow an individual for an extended period of time but not record or store much information during that time period. The more data (e.g., photographs, recordings, scanner usage) that a drone collects over a period of time, the more thorough a court should consider the surveillance to be.

d. *The Individualized Focus Factor*

When applying the individualized focus factor, courts should be more likely to limit the government's ability to store, aggregate, transfer, or distribute information observed through drone surveillance when the government focuses on a specific individual without a warrant or probable cause. The individualized focus factor will function similarly to the thoroughness factor. A main distinction, however, is that drone surveillance can assume an individualized focus without necessarily involving a thorough collection of information. If, for example, a police drone operator arbitrarily magnifies the image of an

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[191] *See* Scherr, *supra* note 175, at 502 ("Even more important than the revolution in image capture is the revolution in computing and data-storage technologies.").

[192] *See* Shachtman, *supra* note 14.

[193] *See* Takahashi, *supra* note 52, at 90–91.

[194] *Cf.* Slobogin, *supra* note 112, at 397 (In the Fourth Amendment context, "[a] few courts have . . . expressed concern about 'blanket' surveillance under which a target's every public movement is conspicuously observed.").

[195] *Cf.* United States v. Jones, 132 S. Ct. 945, 949, 954–57 (2012) (Sotomayor, J., concurring).

individual wearing a hooded sweatshirt, a court might weigh the individualized focus factor in favor of the individual's privacy interests.[196]

e. *The Presence of a Warrant or Probable Cause*

The constitutional right to privacy does not subsume the Fourth Amendment, as the right's balancing test would reject claims that should properly involve the Fourth Amendment. This result is reached by factoring the presence of a warrant or probable cause in favor of the government's interest in drone surveillance. In the situation where the government has a warrant or probable cause to conduct surveillance, a court should typically find that the government's interest outweighs the individual's privacy interest and thus that the government can record, aggregate, transfer, and distribute information gathered through drone surveillance in accordance with the warrant or in conformity with the suspicion underlying the probable cause.

3. *Remedies: Limiting the Storage and Use of Information Observed by Drones*

To ensure that the constitutional right to privacy as applied to drone surveillance does not encroach upon the Fourth Amendment, the right to privacy should only regulate the storage, aggregation, transfer, and distribution of information observed during drone surveillance. Rather than replacing the Fourth Amendment's protections, the constitutional right to privacy augments the Fourth Amendment's privacy safeguards. So, if a court were to find a violation of the constitutional right to privacy in a situation where the drone surveillance in question does not constitute a search under the Fourth Amendment, the court could prohibit the government from storing, aggregating, transferring, or distributing any information gathered in the challenged surveillance while still permitting the government to observe drone information feeds in real-time. Distinguishing between real-time observation and storage allows courts to ameliorate many of the concerns related to drone information gathering while still permitting law enforcement to engage in the surveillance tactics permitted under the Fourth Amendment. Additionally, limiting law enforcement to real-time observations functions as a practical limitation to the number of surveillance operations that an agency can engage in at any given time. Faced with manpower limitations, agencies will only observe in real-time the most important surveillance operations.[197]

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[196] *Cf.* Schwartz, *supra* note 70, ¶¶ 42–43 (contending that integrated camera system operators in the City of Chicago should only be able to zoom in on "any person or their possessions" if the operator reasonably suspects the person "of criminal activity or of a threat to public safety").

[197] *Cf. Jones*, 132 S. Ct. at 964 (Alito, J., concurring).

In summary, the single threshold requirement for pleading a claim under the federal constitutional right to informational privacy, coupled with the replacement of a "reasonable expectation of privacy" test with a balancing test, make the proposed constitutional right to privacy a much more viable tool in safeguarding against drone privacy intrusions as compared to the Fourth Amendment alone. Moreover, by regulating the storage, aggregation, transfer, and distribution of information observed during drone surveillance, the constitutional right to privacy provides a privacy remedy that extends beyond what the Fourth Amendment can offer.

VI. CONCLUSION

By 2015 the FAA will have integrated drones into the national airspace.[198] Government agencies and private organizations currently operate drones under fairly restrictive regulations. With the integration of drones into the national airspace, government agencies and private entities anticipate dramatically expanding their use of drones.[199] This rapid expansion of domestic drone use entails a unique threat to privacy. Drones can operate clandestinely over a broad area for extended periods of time, making them ideal surveillance tools. Operators can easily equip drones with high-resolution cameras, sensors, and video analysis programs.[200] With current electronic storage systems, any information collected by drones—including photographs, videos, and sensory data—can be stored indefinitely for subsequent aggregation, analysis, and distribution. Whether government drone operators collect information intentionally or unwittingly, the result is equally disquieting: substantial amounts of personal information could be collected and stored through drone surveillance of public areas.

Current privacy protections are inadequate to safeguard against intrusive government drone surveillance, especially drone surveillance conducted in public areas. The paucity of statutory and regulatory protections aimed at regulating drone surveillance leaves the Fourth Amendment as the most promising protection presently available. However, the Fourth Amendment's protections prove unsatisfactory. The test for a privacy infringement under the Fourth Amendment is whether a party has manifested a subjective expectation of privacy that society is willing to recognize as reasonable.[201] The reasonableness requirement narrows the area where an individual can expect to remain free from drone surveillance to the home, particularly, those areas of the home that are not visible to the public.[202]

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[198] *See FAA Makes Progress with UAS Integration*, *supra* note 2.

[199] Roberts, *supra* note 18, at 492, 498.

[200] *See* STANLEY & CRUMP, *supra* note 4, at 4–6.

[201] Katz v. United States, 389 U.S. 347, 361 (1967) (Harlan, J., concurring).

[202] *See* Kyllo v. United States, 533 U.S. 27, 34 (2001); California v. Ciraolo, 476 U.S. 207, 213–15 (1986); Dow Chem. Co. v. United States, 476 U.S. 227, 235, 238–39 (1986).

The Supreme Court has assumed, but not definitively asserted, that the Constitution encompasses a right to informational privacy.[203] Drawing on this assumption, a majority of circuits have recognized the constitutional right to informational privacy. Lower courts have typically adjudicated constitutional privacy claims through the application of a balancing test that weighs an individual's privacy interests against the government's interest in undertaking the challenged action. Nonetheless, the absence of definitive contours to the constitutional right to informational privacy renders the right flexible to adapt to new circumstances. The specter of pervasive government drone surveillance of public areas should impel courts to revisit the contours and application of the constitutional right to informational privacy.

The constitutional right to informational privacy can provide a much more effective safeguard against ubiquitous drone surveillance than can the Fourth Amendment alone. The proposed balancing test under the constitutional right to privacy does not weigh the reasonableness of a person's expectation of privacy; instead, if a government-operated drone observes an individual, a court would weigh the individual's privacy interest against the government's interest in engaging in the challenged drone surveillance.[204] If the individual's privacy interests outweigh the government's interests, the court could regulate the storage and use of information observed through the challenged drone surveillance.[205] The proposed remedy produces a compromise that perhaps both drone proponents and privacy advocates can live with: the government can still engage in real-time observation but it cannot store, aggregate, and distribute reams of private information in the process.

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[203] *See* NASA v. Nelson, 131 S. Ct. 746, 751, 756–57, 762–64 (2011).

[204] *See supra* Part V.A.2.

[205] *See supra* Part V.A.3.